Workstream:

Transportation Planning

The Case Study for Enhanced Transportation Planning Tool Requirements

December 3, 2008

NCDOT Transformation Management Team Transportation Planning Assessment

Tool Requirements Work Stream

Items to be reviewed

Establish a task force comprised of North Carolina Department of Transportation (NCDOT) (Transportation Planning, Information Technology and Quality Enhancement Branches, Metropolitan Planning Organizations (MPOs), Rural Planning Organizations (RPOs), and the North Carolina Department of Natural Resources (DENR), etc. to develop a requirements document (specifications) to be used in the procurement of a Geographical Information Systems (GIS) and technical analysis tool to support planning and public involvement activities in the development of comprehensive, sustainable, multi-modal transportation plans. The task force should have a clearly defined delivery metric to accomplish this task.

An outcome of the task force may be a tool kit that would be made available for TPB staff and their partners (MPOs, RPOs, local governments and other state and environmental agencies). The tool kit should include the following:

1. The ability to conduct planning activities to meet the needs whether it is a corridor, area-wide, regional, or interchange study, plans that link planning and National Environmental Policy Act (NEPA), and plans for transit or pedestrian oriented developments.
2. Public involvement efforts should include more community outreach tools, visioning workshops, scenario planning or charettes, visualization tools and simulation techniques.
3. The GIS and technical analysis tools researched will help planners consider a wide variety of environmental, land use and transportation issues and to visually depict those ideas to the public.

Transportation Planning is a complex, data driven process whereby population, employment, housing, land use and transportation data are compiled and used to influence transportation decisions. Data derived from travel demand models are used to estimate roadway capacity, demand, and future roadway improvements. Model output data is also used to assist in determining air quality, environmental, and social impacts. A traditional travel demand model is unable to develop land use scenarios or graphically depict model outputs or analyze proposed roadway impacts to the natural and built environment. Quality transportation and land use planning require that reliable data be collected and used throughout the planning process. A community's vision, goals and objectives are the basis of a good transportation plan. Public involvement becomes the number one component of a successful transportation planning process because it provides citizens, resource and governmental agencies an opportunity to provide input in the transportation planning process.

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Research and Findings

A team was assembled to conduct research and if necessary make recommendations regarding the use of software in the transportation planning process. The team included Loretta Barren, FHWA; Julie Hunkins. NCDOT; John Farley, NCDOT, GIS Unit, Pryia Nimbole, NCDOT, TPB; Chris Lukasana, Jacksonville MPO/Consultant; Daniel VanLiere-UCPRPO; John Amoroso, DENR; and Robert Cook, Mecklenburg Union MPO.
The team met in person and via conference call to discuss the task and direction to accomplish the task. The list of tools discussed in the Transportation Planning Assessment was used as the starting point. A list of questions was developed to ensure that our research would solicit comparable information (Appendix A). Each team member selected a tool to research and document. A matrix of each tools requirements and capabilities was developed (Appendix B).

Across the country State Departments of Transportations, Metropolitan Planning Organizations (MPOs) and consultants are using geographical information systems; both private and public land use and transportation planning tools to enhance the land use and transportation planning process. These software tools are being used to provide the public and stakeholders with a visual depiction of the transportation plan and its impacts. The North Carolina Department of Transportation (NCDOT) Transportation Planning Branch (TPB), Metropolitan Planning Organizations (MPO), Rural Planning Organizations (RPO) and City's and Towns should have more tools at their disposal that will allow them to better consider the community's vision, goals and objectives, land uses, environmental and social impacts in the transportation planning process. General Statute 136-66.2(b1) states that, … the Department of Transportation may not adopt or update a transportation plan until a local land development plan has been adopted…. This is important to achieving and maintaining a sustainable linkage between land use and transportation, and managing the State's investment in transportation infrastructure.

We cannot hope to use limited resources to plan for and implement an effective and strategic transportation infrastructure without developing transportation plans based on adopted and sustainable land use plans. The use of land use and transportation planning tools will allow planners to analyze proposed transportation impacts on the environment (natural and built) and present outcomes to elected and appointed officials, stakeholders and the public in a visual and user friendly manner. The team participated in demonstrations of Paint the Region, MetroQuest, CorPlan and CommunityViz. The following is a summary of the tools researched:

CommunityViz - is a tailored GIS software package that allows users to create and manipulate a virtual representation of a town and explore different land use scenarios. The tool has been used for the States of Utah and Colorado. CommunityViz combines tools for setting up alternative future scenarios and analyzing the effects, tools for making interactive three-dimensional (3-D) models of now and the future, tools for explaining and communicating across many different groups of people with ArcGIS to help enhance decision-making. The tool can be purchased with consultant assistance. If purchased without consultant assistance an average size desktop computer, ArcGIS and Windows 2000 or XP would be needed.

MetroQuest (Envision) - is a regional scenario planning/analysis tool developed in Canada. MetroQuest allows agency staff and workshop participants to create regional transportation and land use scenarios on the fly, see scenarios evolve over time, evaluate key tradeoffs, examine scenarios in detail, and compare scenarios side by side. Underlying MetroQuest is

a model linking demographics, land use, transportation, the macro economy, infrastructure, air quality, water, and energy. The tool has been used by Idaho DOT, and in Canada. MetroQuest is ideally suited to engaging large numbers of stakeholders and the public, communicating complex planning concepts easily, heighten public awareness, increase public and stakeholder participation, increase understanding of policy decisions surrounding land use and transportation, and create broad-based consensus for the future vision.

Paint The Region - GIS-based tool used to develop demographic forecasts at a municipal and regional level. Similar land uses are grouped into "paint palettes" representing different land use types and densities. Using a laptop computer and stylus driven monitor, users apply the paint palettes to parcels or land use polygons within their community. The software calculates total population, households, and jobs based on an allocation. A version of the model is available with three-dimensional representation capabilities. Paint the Region is designed to support large-scale public involvement processes using the web or distributed laptops at public meetings. It offers a unique opportunity for stakeholders to create geographic scenarios on the-fly and get indicator feedback for iterating to consensus-based plans. The tool comes with indicators that land use, housing, employment, open space and storm water runoff, etc. It's also an ideal tool for staff use in assembling spatial forecasts of population and employment growth needed for regional transportation planning. A version of the tool has been used by Kansas City, Seattle, Atlanta and Chicago Metropolitan Planning Organizations (MPOs).

Rural Traffic Shed Model - The rural traffic shed model is a method for allocating development permits based on the capacity of the roadway system. It is most applicable where there is a general flow of traffic towards an urban center. The method requires dividing a rural area into "traffic sheds" based on land served by various collectors and arterials. Trip generation rates associated with various land uses are applied to estimate traffic volumes and compare future volumes to roadway capacity with a given amount of development. The method includes a market-based system for phasing development concurrent with roadway improvements. This tool would provide an understanding about the relationship between planning, zoning and roadway capacity. It is typically used to justify new developments impact on existing roadways, monitor and potentially curb sprawl, and provide credence for impact fees. This tool has been used by the Little Rock, AK MPO and Williams County, TN.

Smart Growth Index 2.0 - is a sketch-planning transportation, land use, and community impact model. The model utilizes parcel or polygon level land use data along with street centerlines and transit routes. Users define an analysis area, select indicators to be measured, assemble GIS data, prepare and evaluate a baseline scenario, prepare and evaluate alternative scenarios, and compare the scenarios. In addition to computing indicators, a forecasting module allows future land use patterns to be forecast based on transportation network accessibility measures. This tool is best used for regional or MPO plans, corridor studies and small area plans. It examines a static or single point in time analyses of multiple scenarios for the current year or a future year. The tool has a menu of 56 indicators for scenario evaluation, such as housing and employment density, land consumption, pollution, etc. This tool has been used by Charleston, SC and Burlington, VT MPs.

What IF? - is an easy-to-use GIS-based system that can be used to explore alternate future scenarios and prepare long-term land use, population, housing and employment projections

for user-defined areas such as school districts, political jurisdictions, and traffic analysis zones. The package is customized to the user's GIS data and policy issues, and provides outputs in a variety of easy-to-understand maps and tables. Policy choices that can be considered in the model include: (1) the expansion of public infrastructure; (2) the implementation of farmland or open space protection policies, and (3) the adoption of land use plans, zoning ordinances, and other growth controls. Assumptions that can be considered in the model include future population and employment trends and development densities. What if has been designed to be used by non-technical people and in public settings, allowing currently available GIS information to be used to support community dialogue and collaborative decision-making.

CorPlan - is a GIS based, scenario development tool that provides detailed land use alternatives that can (can be inputted or is inputted) inputted into a travel demand model. It can provide a range of objective indicators to evaluate a variety of alternative growth strategies, modeled for transportation impacts and mapped graphically. CorPlan estimates regional land development potential using prototypical "community elements" as building blocks. Each element also has a unique set of socioeconomic and land use characteristics. Elements are manually assigned to different areas and then corresponding data is aggregated using GIS and is used as input to the travel demand model. CorPlan can be adapted for many different scales and sizes. CorPlan is being used by the Charlottesville, VA and Binghampton, NY MPOs.

PLACES^3 - (Planning for Community Energy, Environmental, and Economic Sustainability) is a GIS-based analytical tool to support community land use and transportation planning. Using parcel or polygon level information on existing and/or future land use, the model calculates a range of community indicators including vehicle-travel, return on investment, housing type mix, land consumption, energy consumption, and other environmental impacts. This is a land use planning tool that uses energy consumption to measure and plan for a sustainable community. This tool has been used by the City of San Diego, CA and the Sacramento MPO.

Recommendations

While all of the tools are similar in nature none are exactly the same. We found that most of the tools researched are GIS-based and therefore will require many data layers in a GIS format in order for meaningful analyses to occur. It is worth mentioning that for any tool to be reliable and effective good quality data will be essential. Our research tells us that no one tool should be recommended, but the establishment of minimum requirements for the implementation of tool selection in transportation planning in the State. Minimum requirements will provide some level of consistency of the planning products being produced throughout the state. State and local agencies should look to invest resources that meet the needs of all citizens by purchasing tools or hiring consultants that will provide the minimum requirements to the appropriate level:

User tools requirements

- Be in a collaborative environment that can easily be shared throughout the enterprise/agency
- Be able to easily share analyses/outputs with various staff within an agency
- Licensing of models will allow concurrent usage among staff/partners (an example would be the NCDOT Transcad License)

- Adhere to modern IT best practices (Use State Information Technology Services (ITS) as a guide)
- Be scalable adaptable for MPO/RPO area, countywide, city, statewide.
- Compatible with TAZ structure
- Data outputs can be easily inputted into travel demand models
- Ability to analyze features and impacts for example (but not inclusive):
    - Wetlands
    - Historic properties
    - Farmlands
    - Sea level rise
    - Storm surge data
- Provide detailed visualization of multi-modal alternatives
- Provide 3-D visualization that depicts consequences of decisions
- Provide detailed technical analysis of multiple land use and appropriate transportation scenarios
- Take into consideration adopted land use and transportation plans
- Take into consideration committed transportation projects and planned transportation improvements
- Have the ability to calculate
    - Vehicle Miles Traveled (VMT)
    - Where should communities develop
    - Traffic impacts
    - Future infrastructure needs
    - Costs
- Depict multiple alternative scenarios
- Provide statistical reports/analysis for multiple alternative scenarios

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
TRANSFORMATION MANAGEMENT TEAM

TRANSPORTATION PLANNING ASSESSMENT

FREIGHT & CABINET LEVEL POSITION HIGHLIGHTS

ANALYSIS & RECOMMENDATIONS
COMPILED OCTOBER 16, 2008

HYPOTHESIS

As the State of North Carolina continues to grow, planning efforts need to be increasingly focused on working efficiently and effectively towards the Department's Mission and Goals. This effort examines the current functions, roles, and responsibilities of transportation planning at North Carolina Department of Transportation (NCDOT) and seeks to determine if we are aligned with the Department's objectives and the needs of the State. Due to the growing demand on our transportation system, increased service needs from our planning partners, stricter air quality conformity requirements, and escalating construction costs; the Department will need to improve the methods and technical expertise of ourselves and our partners to best deliver multi-modal transportation planning that meets the State's transportation needs in the most cost effective manner.

RESEARCH AND FINDINGS /RECOMMENDATIONS

1) *Need to best align our resources, and the resources of our partners, to efficiently and effectively deliver quality transportation planning services.*

2) *Need to establish and support a systematic approach to help us best deliver quality transportation planning services in a cost effective manner.*

3) *Need to expand transportation planning efforts to assume a more comprehensive approach.*

- The Department will utilize the workgroups formed in part 2 to identify and develop tools and standards necessary to carry out a multimodal transportation planning process. The process will include a mechanism for coordination between all modes during the development, adoption, and revision of CTPs.

- Incorporate operational strategies such as signal systems, access management, Intelligent Transportation Systems (ITS), etc. in CTP recommendations. Dedicate a position that will serve as the technical specialist for developing and identifying operational strategies to be used in the development of corridor studies and CTPs. This position will provide the State with technical guidance and training for areas of traffic engineering expertise including capacity analysis, planning for traffic efficiency, access control and management, safety, and other innovative approaches to addressing future capacity deficiencies at the systems planning level. This position will regularly interact with MPOs / RPOs / local staff, other DOT modal divisions, Transportation Divisions, and Federal Highway Administration (FHWA).

- The State needs a better way to establish planning goals, targets, performance measures and associated policies to ensure that North Carolina plans for expected growth in an efficient and effective manner considering: quality of life, air quality, efficient use of available State resources, transportation mobility for all modes, energy use, economic development, land use including preservation of farm land and green space, water availability and quality, the need to reduce vehicle miles traveled, and the plans and needs of adjoining states. This could be accomplished either by:

    1. A **cabinet level State planning organization** tasked with working with other State agencies to provide the activities identified above, or,
    2. if support can not be obtained for the above, we recommend that the develop a multi-agency planning group, including local and regional planning partners (as appropriate), tasked with recommending:
        - High level planning objectives (and associated limits) for each of the following to be used as the State plans to accommodate growth projections: quality of life, air quality, efficient use of available State resources, transportation mobility considering all modes, energy use, economic

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ISSUE TO BE REVIEWED (HYPOTHESIS) ……3¶
RESEARCH AND FINDINGS……3¶
RECOMMENDATIONS……4¶
Page Break

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development, land use including preservation of farm land and green space, water availability/quality, reducing vehicle miles traveled, and others.

(Need to consider the findings of the State Logistics Plan developed for the Office of State Budget and the I-95 Corridor Coalition "Strategic Vision Study Objectives & Scenarios" and any other federal or State guidance that is available)

- Goals, targets and performance measures for each of the above that can be used by each agency in support of the common objectives
- Areas/initiatives where the agencies can partner to meet these goals in a more efficient and effective manner for the State.
- Coordinated responses/action related to, State studies, State opportunities involving multiagency planning and multistate planning such as:
    - State Logistics Plan
    - North Carolina International Terminal
    - Products of the I-95 Corridor Coalition, etc.

- Support recommendations from the Mobility Work Group to establish a process to incorporate multi-modal and multi-faceted solutions based on recurring assessments of the mobility needs in our state by tier. Mobility in this context means increasing connectivity as well as reducing congestion. This must include looking at the needs of all transportation customers including citizens, businesses and the freight industry. (This task should include building on the outcome of the Statewide Logistics Planning effort currently underway by Office of State Budget and Management (OSBM) through Institute Transportation Research and Education (ITRE)). This group must prioritize the mobility needs of the state based on the targets and data defined in the "Mobility Subteam Recommendations and Implementation Plan."

- Land development planning standards, to be developed as part of the integration process, should include incentives for local and regional land use agencies to coordinate implementation of Land Development and Transportation Plans.

- Establish a task force comprised of NCDOT, MPOs, RPOs, Information Technology, Department of Natural Resources (DENR), etc. to develop a requirements document (specifications) to be used in the procurement of a GIS and technical analysis tool to support planning and public involvement activities in the development of comprehensive, sustainable, multi-modal transportation plans. The task force should have a clearly defined delivery metric to accomplish this task. The GIS based tool(s) should:

    1. Have the ability to conduct planning activities to meet the needs whether it is a corridor, area-wide, regional, or interchange study, plans that link planning and NEPA, plans for transit or pedestrian oriented developments.
    2. Provide capabilities in support of community outreach, visioning, scenario planning, charettes, visualization, and simulation.
    3. Allow planners to consider a wide variety of environmental, land use and transportation issues and to visually depict those ideas to the public. For example but not limited to:

- Solicit guidance from national practitioners as to the most effective tool(s) for analyzing the statewide tier. The tool(s) should provide a mechanism to compare various alternatives, modal options, and operational strategies.

- Continue to support the development and maintenance of the statewide truck model. Determine data needs to allow future updates. Our travel demand models need to better reflect truck Average Daily Traffic and truck patterns/circulation within a local and/or regional area and be adaptable to changing economic/freight conditions. NCDOT needs to better understand corridor/system impacts of major distribution centers and intermodal terminals. The science of truck forecasting needs to improve, and our ability to model interaction between truck, rail, ship and aviation freight movement needs to improve. A technical opportunity we have is to

further develop a Statewide Truck Network Model (1st phase of 3-year research projected will finish this summer) that North Carolina State University/ITRE has helped us build. It is built on federal data and could potentially be used to study diversion of freight from highway to rail or vice versa. Currently there are no additional research dollars to push this project into the next fiscal year.

- **NCDOT needs to consider establishing a single point of contact (person or unit) dedicated to monitoring, researching, coordinating, advising and leading freight related initiatives**. Dedicated staff would help with the following issues:

1. Increasing emphasis on all aspects of freight (commodity data, demand models, participation of shippers/ports/trucking/railroads, staff at MPO level, system performance, operations and technology, funding, etc.)
2. Rapidly changing economic conditions and globalization. Every major commerce and trade journal points to the nation's transportation system as the "core component" of a global supply change, i.e., goods are spending less time in warehouses and more time on trucks. In urban areas of the country companies are staggering truck start and end times to avoid am/pm peak and this is creating a "new" peak in the middle of the day. The US is moving to a service-based economy which means more dual axle delivery trucks and trips 24 hours a day and additional truck traffic is creating capacity constraint and air quality problems. Bottom line is time equals money and deteriorating freight reliability is going to cost US consumers more to buy goods and hurt US economy overall.
3. NCDOT needs "eyes and ears" to follow national best practice and adopt ideas from others and to better coordinate responses to a number of initiatives. A great freight framework to follow is in Florida DOT, called the Strategic Intermodal Transportation System. http://www.dot.state.fl.us/planning/sis/. Other active initiatives (not exhaustive) to follow are:

    - development of the NC International Terminal in Southport and related transportation needs assessment/planning
    - development of the Norfolk Southern Intermodal Facility at the Charlotte Douglas Airport and a CSX intermodal facility that will be needed.
    - I-95 Corridor Coalition
    - NC Statewide Logistics Study
    - participating in FHWA monthly webinar (freight to freight conversation) http://www.ops.FHWA.dot.gov/freight/fpd/talking_freight.htm
    - Institute for Trade and Transportation (3 year commitment -- starting in 2007 for building a freight research center in New Orleans to provide freight consultation, technical assistance to 12 southeastern State DOTs)
    - National Cooperative Highway Research Program Project 8-53 Integrating freight into planning and programming
    - I-95 Corridor Coalition sponsored Southeast Rail Operations Study (SEROPs) and Mid-Atlantic Rail Operations Study (MAROPs) type initiatives that Shirley Williams and staff have been involved in
    - Inland terminal study by Western Carolina University

NEED TO BEST ALIGN OUR RESOURCES, AND THE RESOURCES OF OUR PARTNERS, TO EFFICIENTLY AND EFFECTIVELY DELIVER QUALITY TRANSPORTATION PLANNING SERVICES.

CURRENTLY THE TRANSPORTATION PLANNING BRANCH (TPB), HOUSED IN THE PRECONSTRUCTION SECTION OF THE DIVISION OF HIGHWAYS, ARE PRIMARILY RESPONSIBLE FOR PROVIDING TRANSPORTATION PLANNING SERVICES FOCUSED ON HIGHWAYS. THE BRANCH INCLUDES THE REGIONAL TRANSPORTATION PLANNING UNITS, THE TECHNICAL SERVICES UNIT, AND THE RESEARCH AND DEVELOPMENT UNIT. THE TPB WORKS WITH A LARGE NUMBER OF PLANNING PARTNERS INCLUDING: METROPOLITAN PLANNING ORGANIZATIONS (MPOS); RURAL PLANNING ORGANIZATIONS (RPOS); OTHER GOVERNMENT ENTITIES; NCDOT DIVISION OFFICES; OTHER BRANCHES/UNITS INSIDE NCDOT; ENVIRONMENTAL RESOURCE AGENCIES; AND CONSULTANTS.

IN THE RECENT PAST, TPB HAS HAD A LARGE NUMBER OF VACANCIES AND A HIGH RATE OF EMPLOYEE TURNOVER. BEING UNDERSTAFFED AND TRYING TO BE ALL THINGS TO ALL PEOPLE HAVE NEGATIVELY IMPACTED THE DELIVERABLES OF THE TPB. IN ORDER TO IMPROVE DELIVERY AND COMMUNICATIONS WITH STAKEHOLDERS, THE TPB WILL NEED TO CONSIDER THE ROLES THAT THE MPOS, RPOS, OTHER GOVERNMENT ENTITIES, NCDOT DIVISION OFFICES, OTHER BRANCHES/UNITS INSIDE NCDOT, AND CONSULTANTS WILL PLAY IN THE FUTURE OF TRANSPORTATION PLANNING. IT WILL BE IMPORTANT TO EXPLORE HOW THE NCDOT'S THREE TIER APPROACH TO DELIVERY WILL NEED TO BE INCORPORATED INTO THE COMPREHENSIVE TRANSPORTATION PLANNING PROCESS. IT WILL ALSO BE NECESSARY TO EXAMINE WHAT FUNCTIONS CURRENTLY HOUSED IN TPB MIGHT BE MOVED TO OTHER BUSINESS UNITS WITHIN NCDOT TO BETTER SERVE THE DEPARTMENT'S MISSION AND GOALS.

CURRENTLY THE OTHER MODES OF TRANSPORTATION (AVIATION, BICYCLE AND PEDESTRIAN, FERRY, PUBLIC TRANSPORTATION AND RAIL DIVISIONS) PERFORM THEIR OWN PLANNING FUNCTIONS WITHIN THEIR BUSINESS UNITS.

NEED TO ESTABLISH AND SUPPORT A SYSTEMATIC APPROACH TO HELP US BEST DELIVER QUALITY TRANSPORTATION PLANNING SERVICES IN A COST EFFECTIVE MANNER.

THE TPB IS RESPONSIBLE FOR A DIVERSE NUMBER OF DELIVERABLES INCLUDING: COMPREHENSIVE TRANSPORTATION PLANS; STRATEGIC HIGHWAY CORRIDOR DOCUMENTS; TRAVEL DEMAND MODELING; PROJECT LEVEL TRAFFIC FORECASTS; AIR QUALITY ANALYSIS AND DOCUMENTATION TO COMPLY WITH THE CLEAN AIR ACT AND ENVIRONMENTAL PROTECTION AGENCY (EPA) REQUIREMENTS; TRAFFIC COUNT INFORMATION TO MEET PROJECT DELIVERY AS WELL AS MEET STATE AND FEDERAL PLANNING REQUIREMENTS; TRAFFIC VOLUME MAPS; SPECIAL PLANNING PROJECTS; AND RESEARCH REPORTS. CONSISTENT DELIVERABLES, MEASURABLE PROJECT MANAGEMENT SKILLS, IMPROVED IT RESOURCES, APPROPRIATE TRAINING AND GUIDANCE, AND STANDARDIZED RULES AND GUIDANCE DOCUMENTS WILL ALL PLAY A PART IN THE SUCCESS OF THE TPB TO MEET THEIR FUTURE EXPECTATIONS.

NEED TO EXPAND TRANSPORTATION PLANNING EFFORTS TO ASSUME A MORE COMPREHENSIVE APPROACH.

AS THE STATE OF NORTH CAROLINA CONTINUES TO GROW, PLANNING EFFORTS ARE INCREASINGLY FOCUSED ON A MULTI-MODAL APPROACH. IN ORDER TO MEET THE GROWING DEMAND ON OUR TRANSPORTATION SYSTEM, THE TPB WILL NEED TO BE A LESS HIGHWAY-CENTRIC ORGANIZATION IN THE FUTURE WHICH WILL INCLUDE MORE COORDINATION AND PARTNERING WITH THE PLANNING STAFFS OF THE AVIATION, BICYCLE AND PEDESTRIAN, FERRY, PUBLIC TRANSPORTATION AND RAIL DIVISIONS.

AS NORTH CAROLINA CONTINUES ITS EFFORTS TO FOCUS ON THE USE OF EXISTING INFRASTRUCTURE, LONG RANGE TRANSPORTATION PLANNING WILL NEED TO CONSIDER ALL ASPECTS OF TRANSPORTATION DELIVERY INCLUDING: CAPACITY, OPERATIONS, MAINTENANCE, PRESERVATION, FREIGHT MOVEMENT, SAFETY, AND MULTIPLE MODES. IN ADDITION, ADDRESSING THE IMPACT OF LAND USE PLANNING ON THE TRANSPORTATION NETWORK WILL BECOME INCREASINGLY IMPORTANT/ESSENTIAL TO MEET OUR MOBILITY AND AIR QUALITY OBJECTIVES.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
TRANSFORMATION MANAGEMENT TEAM

TRANSPORTATION PLANNING ASSESSMENT

ANALYSIS & RECOMMENDATIONS
JUNE 25, 2008

Table of Contents

ISSUE TO BE REVIEWED (HYPOTHESIS)

As the State of North Carolina continues to grow, planning efforts need to be increasingly focused on working efficiently and effectively towards the Department's Mission and Goals. This effort examines the current functions, roles, and responsibilities of transportation planning at North Carolina Department of Transportation (NCDOT) and seeks to determine if we are aligned with the Department's objectives and the needs of the State. Due to the growing demand on our transportation system, increased service needs from our planning partners, stricter air quality conformity requirements, and escalating construction costs; the Department will need to improve the methods and technical expertise of ourselves and our partners to best deliver multi-modal transportation planning that meets the State's transportation needs in the most cost effective manner.

RESEARCH AND FINDINGS

1) *Need to best align our resources, and the resources of our partners, to efficiently and effectively deliver quality transportation planning services.*

   Currently the Transportation Planning Branch (TPB), housed in the Preconstruction Section of the Division of Highways, are primarily responsible for providing transportation planning services focused on highways. The Branch includes the Regional Transportation Planning Units, the Technical Services Unit, and the Research and Development Unit. The TPB works with a large number of planning partners including: Metropolitan Planning Organizations (MPOs); Rural Planning Organizations (RPOs); other government entities; NCDOT Division Offices; other branches/units inside NCDOT; environmental resource agencies; and consultants.

   In the recent past, TPB has had a large number of vacancies and a high rate of employee turnover. Being understaffed and trying to be all things to all people have negatively impacted the deliverables of the TPB. In order to improve delivery and communications with stakeholders, the TPB will need to consider the roles that the MPOs, RPOs, other government entities, NCDOT Division Offices, other branches/units inside NCDOT, and consultants will play in the future of transportation planning. It will be important to explore how the NCDOT's three tier approach to delivery will need to be incorporated into the Comprehensive Transportation Planning process. It will also be necessary to examine what functions currently housed in TPB might be moved to other Business Units within NCDOT to better serve the Department's Mission and Goals.

   Currently the other modes of transportation (Aviation, Bicycle and Pedestrian, Ferry, Public Transportation and Rail Divisions) perform their own planning functions within their Business Units.

2) *Need to establish and support a systematic approach to help us best deliver quality transportation planning services in a cost effective manner.*

   The TPB is responsible for a diverse number of deliverables including: Comprehensive Transportation Plans; Strategic Highway Corridor documents; travel demand modeling; project level traffic forecasts; air quality analysis and documentation to comply with the Clean Air Act and Environmental Protection Agency (EPA) requirements; traffic count information to meet project delivery as well as meet State and Federal planning requirements; traffic volume maps; special planning projects; and research reports. Consistent deliverables, measurable project management skills, improved IT resources, appropriate training and guidance, and standardized rules and guidance documents will all play a part in the success of the TPB to meet their future expectations.

3) *Need to expand transportation planning efforts to assume a more comprehensive approach.*

   As the State of North Carolina continues to grow, planning efforts are increasingly focused on a multi-modal approach. In order to meet the growing demand on our transportation system, the TPB will need to be a less

highway-centric organization in the future which will include more coordination and partnering with the planning staffs of the Aviation, Bicycle and Pedestrian, Ferry, Public Transportation and Rail Divisions.

As North Carolina continues its efforts to focus on the use of existing infrastructure, long range transportation planning will need to consider all aspects of transportation delivery including: capacity, operations, maintenance, preservation, freight movement, safety, and multiple modes. In addition, addressing the impact of land use planning on the transportation network will become increasingly important/essential to meet our mobility and air quality objectives.

RECOMMENDATIONS

1) *Need to best align our resources, and the resources of our partners, to efficiently and effectively deliver quality transportation planning services.*

- Provide a multi-modal transportation planning engineer staffed to the Division whose role is to carry out planning functions which are fully integrated with the local MPOs, RPOs, and other local jurisdictions. This expertise would enhance local transportation plans through local knowledge of the Division along with improved "common cause" relationships between the Division and local government entities. In addition, integration of transportation infrastructure and land use would be facilitated in a more compatible manner. Possible duties for this position include: performing studies necessary to evaluate highway improvement alternatives, making project recommendations in coordination with Project Development and Environmental Analysis (PDEA) and the Transportation Planning Branch, serving as a liaison between Central staff and MPOs/RPOs, and assisting the Division in access management decision making.

  This implementation could follow the successful model used for Division Environmental Officers and Safety Engineers now assigned to each Division. Employees in these positions live and work within the Division but maintain close ties to the Roadside Environmental Unit, PDEA, and the Safety & Loss Unit, respectively. Quarterly or bi-annual meetings, combined training, and frequent communication and collaboration with central planning units would be critical for successful implementation of this position within the divisions.

  Proof of concept could be achieved by providing this position on a pilot basis to a limited number of Divisions based on overall growth and planning workload. A majority of Division Engineers see a distinct advantage to having a stronger local planning presence in their division so it is very probable that a successful pilot would lead to phasing in this position in other Divisions over a 2 to 3 year timeframe if not sooner.

  Establish a working group to identify and develop the role/responsibilities and distribution of planning tasks between the Divisions and the Transportation Planning and PDEA Branch staffs. The planning tasks should be identified as whether it is a part of Comprehensive Transportation Plan (CTP), MPO Planning, project development or project implementation.

- TPB currently has staff that focuses strictly on long-range planning for the Statewide Tier. Consider expanding and/or reorganizing so that a group can focus on meeting the planning needs for the statewide tier. While this group would be separate from other planning groups, with distinct responsibilities, they would work together on common problems. For example, someone working on a statewide tier corridor study would work with other staff whose main focus is to fulfill the state's vision at the local level.

- For the purposes of transportation planning the system must be analyzed and considered in its entirety. To manage the transportation system, the Department has divided the system into three tiers – Statewide, Regional, and Subregional.

  Statewide Tier – The goal is to provide for the "connectivity of people and places in North Carolina, safely, efficiently and with accountability and environmental sensitivity."

  Regional Tier – The goal is to provide mobility options within identified regions.

  Subregional Tier – The goal is to provide mobility options at the county and local level.

The North Carolina Department of Transportation is responsible for developing and maintaining the Long-Range Statewide Multimodal Transportation Plan (STP); the STP will serve as the basis for all planning initiatives on the statewide tier.

The Department, in cooperation with our planning partners, will establish expectations and performance measures for each tier. These performance measures will be used to analyze and evaluate CTPs.

- Consider moving the Research and Analysis Unit to an area within the Department that would allow them to be better aligned with their mission to serve the research needs of all of NCDOT.

- Study the issue of how TPB is providing Traffic Forecasts on time and to the satisfaction of their customers. Look into the best method to position staff that would have the responsibility of assigning forecasts and overseeing quality in order to improve service. Consider structural, role/responsibility improvements that are needed to turn forecasts around faster. Explore opportunities to provide for career advancement within the Traffic Forecasting Groups.

- TPB should develop standards, guidelines, and MPO / RPO / Division roles and responsibilities in the development of a CTP. While we recognize every study is different, "standards" would help define the roles and should improve study delivery and remove some of the study burden from TPB staff. This should better help define and use RPO staff resources. This would allow TPB to outsource duties in a manner that allows the highest and best use of NCDOT resources.

- Project management duties for Congestion Mitigation and Air Quality (CMAQ) projects should be reassigned to the Divisions or Business Unit with the appropriate expertise. (An update of the CMAQ process is currently underway and is expected to go to the Environment Policy and Planning Committee (EPPC) of the BOT in July or August).

- Consider consolidation of the 20 RPO positions to align with the Division boundaries. Currently, 13 of the RPOs are in 2 divisions and 3 RPOs are in 3 divisions. This makes it difficult for Divisions and Board Members to provide adequate service, including attending various RPO meetings. There would also be some other efficiency gains with consolidation. However, eliminating 6 RPOs would be very controversial and could become political. There is also a concern with some RPOs meeting quorum for meetings, and bigger RPOs (based on divisions) may exacerbate this problem. This group recommends forming a leadership work group to further consider methods to improve efficiency between the RPOs, TPB, and the Divisions. In addition, the leadership work group could consider modifying Division boundaries to better align with MPO boundaries.

- Once new transportation functions are defined and planning roles and responsibilities are established, an assessment needs to be done to determine the number and type of personnel and supervisory resources required to meet the established goals and objectives in each of the modal planning organizations. It is essential that the salary grades for staff in all modes be aligned to ensure equity.

2) *Need to establish and support a systematic approach to help us best deliver quality transportation planning services in a cost effective manner.*

- TPB needs to be more strategic/prudent about the development and delivery of CTPs statewide. In cooperation with our planning partners, TPB should strive to do a better job of prioritizing which areas need CTPs, and which ones are low priorities (or may not be needed at all). It is recommended that a work group be formed to look at the prioritization of CTPs to ensure critical needs are being met. The CTP prioritization process could be based on growth, TIP projects, age of plan, etc. Another way to handle this is to conduct an annual meeting (including Unit Heads and Group Supervisors) prior to new Performance Dashboard and Appraisal cycle to determine which CTPs to launch this year and why. Milestones and metrics would be established for the most critical CTPs. Each year the TPB Branch Manager could ask each Group Supervisor to present 1) progress on the CTPs under them, 2) explain why there are delays (if any) and 3) share any innovative ways/best practice lessons learned. This would improve accountability, put pressure on units to improve delivery, and force improved communication

between units/staff. Develop a mechanism to monitor and provide minor updates for existing CTPs as needed.

TPB should encourage our planning partners to cooperatively develop CTPs in a more coordinated and regional manner, especially in regards to creating CTPs in rural areas. The Granville County study is a model to incorporate multiple stakeholders upfront and throughout the process and proposing improvements (that impact more than one area), and getting local adoption(s) and endorsements of the CTP. Overall, the process may take slightly longer than a standard CTP, but it is far more efficient than doing several separate studies, and it forces the locals to consider regional transportation solutions. The odds for protecting the integrity of the CTP go up due to vested interest from multiple partners (officials from the municipality, county, RPO, MPO, Council of Government (COG), etc.)

Conversion of Thoroughfare Plans to CTPs is underway in the MPOs. The CTP process will address the relationship between the LRTP and the CTP. Continue converting MPO Thoroughfare Plans to CTPs. TPB has spent a lot of time creating CTP mapping standards and developing more standardized definitions and visual format for how CTP maps should look. Migration of more Thoroughfare Plans to these mapping standards creates a consistent look (regardless if the CTP is for a small rural area or a large MPO). An Issue is accountability and dividing up the labor between TPB staff and local planners.

- Establish work groups between DOT Business Units, MPOs and RPOs. The deliverable would be policies and procedures that would clearly define the roles, responsibilities, and performance metrics.

- Establish a work group to study training needs to be provided to existing staff and external planning partners.

- Continue to push the Integration Project forward. The Integration Project is a planning process that provides a seamless connection between long-range transportation planning and project development that ultimately leads to supporting the timely delivery of projects by NCDOT. This project has been endorsed and is supported by the Interagency Leadership Team (ILT) which includes senior management in NCDOT, FHWA, and other State and Federal agencies. While the Integration Project outlines the overall process, the actual implementation will rely on the work of specialized teams that will detail specific aspects of the overall project and incorporate these details in Department procedures. Key implementation items are contingent on the development of the GIS and technical analysis tool for *Document Management & Project Collaboration* which includes a statewide GIS database – similar to Florida's Efficient Transportation Decision Making (ETDM) system. Key implementation items are:

    1. Develop data and documentation standards to support Problem Statement development;
    2. Develop data and documentation standards to support the determination of "unreasonable" solutions in the CTP process;
    3. Develop data and documentation standards for alternatives and scenario analysis in the CTP process;
    4. Develop process for identifying and documenting Indirect and Cumulative Effects (ICE) in the CTP process;
    5. Develop process for documenting community impact data in the CTP process;
    6. Develop a public participation toolkit that would provide guidance on engaging the public in transportation planning and enable information gathered in long range planning to be transferred to project development (underway through contract in Office of Environmental Quality); and
    7. Develop land development plan standards (land use standards) necessary for carrying out the CTP process.

  There needs to be dedicated staff and other resources to oversee the implementation tasks. Completed implementation tasks should be incorporated into standard planning practices for CTPs. Products from transportation planning that are used to make decisions in the project development process (National/State Environmental Policy Act - NEPA/SEPA process) should be monitored and evaluated as to their effectiveness in reducing the amount of time and new data needed to get a Purpose and Need and reducing the number of alternatives that are carried forward for detailed study.

- The transportation planning process needs additional IT support, including a new server, computers that can adequately run Geographical Information Systems (GIS) and regional travel demand models, software, and hardware.

- Take advantage of video conferencing technology solutions to minimize travel time/expenses and provide an increased presence at meetings.

- To improve customer service and productivity, replace the existing non-functioning telephone voicemail system within the Transportation Planning Branch.

- TPB should consider adding GIS expertise to the branch to remove some of the mapping burden off the transportation engineers. Having dedicated GIS expertise would allow the Transportation Engineers to work on other tasks and should accelerate CTP schedules.

- In Traffic Forecasting, TPB is now reactive instead of proactive. TPB engineers do not know if a forecast is coming from a customer until it arrives, and TPB "reacts" by assigning that forecast to staff (or outsourcing). Depending on the nature of forecast, it may cause delays in other work. TPB and its forecasting customers should fully utilize Project STaRS and/or communication improvements so upcoming forecasts could be anticipated by TPB and possibly easily absorbed into the TPB work stream.

- While CTPs should not be constrained by funding considerations as the plans are being developed, project recommendations should be prioritized such that as funds become available projects are delivered in accordance with the established priorities.

- Any prioritization tool that is under development should include recommendations from the CTPs.

- Support current on-going research project entitled "Development of Performance Measures for the Assessment of Rural Planning Organizations." Provide NCDOT staff to follow through on identified problems and suggested solutions from these assessments related to how RPOs can improve.

3) *Need to expand transportation planning efforts to assume a more comprehensive approach.*

- The Department will utilize the workgroups formed in part 2 to identify and develop tools and standards necessary to carry out a multimodal transportation planning process. The process will include a mechanism for coordination between all modes during the development, adoption, and revision of CTPs.

- Incorporate operational strategies such as signal systems, access management, Intelligent Transportation Systems (ITS), etc. in CTP recommendations. Dedicate a position that will serve as the technical specialist for developing and identifying operational strategies to be used in the development of corridor studies and CTPs. This position will provide the State with technical guidance and training for areas of traffic engineering expertise including capacity analysis, planning for traffic efficiency, access control and management, safety, and other innovative approaches to addressing future capacity deficiencies at the systems planning level. This position will regularly interact with MPOs / RPOs / local staff, other DOT modal divisions, Transportation Divisions, and Federal Highway Administration (FHWA).

- The State needs a better way to establish planning goals, targets, performance measures and associated policies to ensure that North Carolina plans for expected growth in an efficient and effective manner considering: quality of life, air quality, efficient use of available State resources, transportation mobility for all modes, energy use, economic development, land use including preservation of farm land and green space, water availability and quality, the need to reduce vehicle miles traveled, and the plans and needs of adjoining states. This could be accomplished either by:

    1. A cabinet level State planning organization tasked with working with other State agencies to provide the

activities identified above, or,

2. if support can not be obtained for the above, we recommend that the develop a multi-agency planning group, including local and regional planning partners (as appropriate), tasked with recommending:

    - High level planning objectives (and associated limits) for each of the following to be used as the State plans to accommodate growth projections: quality of life, air quality, efficient use of available State resources, transportation mobility considering all modes, energy use, economic development, land use including preservation of farm land and green space, water availability/quality, reducing vehicle miles traveled, and others.

      (Need to consider the findings of the State Logistics Plan developed for the Office of State Budget and the I-95 Corridor Coalition "Strategic Vision Study Objectives & Scenarios" and any other federal or State guidance that is available)

    - Goals, targets and performance measures for each of the above that can be used by each agency in support of the common objectives

    - Areas/initiatives where the agencies can partner to meet these goals in a more efficient and effective manner for the State.

    - Coordinated responses/action related to, State studies, State opportunities involving multiagency planning and multistate planning such as:

        - State Logistics Plan
        - North Carolina International Terminal
        - Products of the I-95 Corridor Coalition, etc.

- Support recommendations from the Mobility Work Group to establish a process to incorporate multi-modal and multi-faceted solutions based on recurring assessments of the mobility needs in our state by tier. Mobility in this context means increasing connectivity as well as reducing congestion. This must include looking at the needs of all transportation customers including citizens, businesses and the freight industry. (This task should include building on the outcome of the Statewide Logistics Planning effort currently underway by Office of State Budget and Management (OSBM) through Institute Transportation Research and Education (ITRE)). This group must prioritize the mobility needs of the state based on the targets and data defined in the "Mobility Subteam Recommendations and Implementation Plan."

- Land development planning standards, to be developed as part of the integration process, should include incentives for local and regional land use agencies to coordinate implementation of Land Development and Transportation Plans.

- Establish a task force comprised of NCDOT, MPOs, RPOs, Information Technology, Department of Natural Resources (DENR), etc. to develop a requirements document (specifications) to be used in the procurement of a GIS and technical analysis tool to support planning and public involvement activities in the development of comprehensive, sustainable, multi-modal transportation plans. The task force should have a clearly defined delivery metric to accomplish this task. The GIS based tool(s) should:

    1. Have the ability to conduct planning activities to meet the needs whether it is a corridor, area-wide, regional, or interchange study, plans that link planning and NEPA, plans for transit or pedestrian oriented developments.
    2. Provide capabilities in support of community outreach, visioning, scenario planning, charettes, visualization, and simulation.
    3. Allow planners to consider a wide variety of environmental, land use and transportation issues and to visually depict those ideas to the public. For example but not limited to:

CommunityViz is a tailored GIS software package that allows users to create and manipulate a virtual

representation of a town and explore different land use scenarios. (Utah and Colorado)

CorPlan is a GIS and spreadsheet-based model to assist in creating alternative regional development scenarios as input to a travel demand model. CorPlan estimates regional land development potential using prototypical "community elements" as building blocks. Each element represents a quarter-mile diameter area and is illustrated by a photograph and plan diagram that conveys its visual characteristics. Each element also has a unique set of socioeconomic and land use characteristics. Elements are manually assigned to different areas and then corresponding data are aggregated using GIS and used as input to the travel demand model. (Charlottesville, VA MPO and Binghamton, NY MPO)

GIS Environmental Mapping/Analysis State, regional, and local agencies, as well as non-profit organizations, have undertaken database development, mapping, and analysis of land use, community, and environmental features using geographic information systems (GIS). These databases and analysis tools have been used to assist in transportation facility routing and planning that minimizes land use, community, and environmental impacts. (Tucson, AZ and Conservation Research Institute, IL)

MetroQuest (Envision) is a regional scenario planning/analysis tool developed in Canada. MetroQuest allows agency staff and workshop participants to create regional transportation and land use scenarios on the fly, see scenarios evolve over time, evaluate key tradeoffs, examine scenarios in detail, and compare scenarios side by side. Underlying MetroQuest is a model linking demographics, land use, transportation, the macroeconomics, infrastructure, air quality, water, and energy. (Idaho DOT, Canada)

Paint the Town/Paint the Region is a GIS-based tool used to develop demographic forecasts at a municipal and regional level. Similar land uses are grouped into "paint palettes" representing different land use types and densities. Using a laptop computer and stylus driven monitor, users apply the paint palettes to parcels or land use polygons within their community. The software calculates total population, households, and jobs based on an allocation. A version of the model is available with three-dimensional representation capabilities. (Chicago MPO and Kansas MO MPO)

PLACE^{3}S (PLAnning for Community Energy, Environmental, and Economic Sustainability) is a GIS-based analytical tool to support community land use and transportation planning. Using parcel or polygon level information on existing and/or future land use, the model calculates a range of community indicators including vehicle-travel, return on investment, housing type mix, land consumption, energy consumption, and other environmental impacts. I-PLACE^{3}s is a variation which can be run over the Internet. PLACE^{3}S software is in the public domain. (Sacramento MPO, City of San Diego)

Rural Traffic Shed Model The rural traffic shed model is a method for allocating development permits based on the capacity of the roadway system. It is most applicable where there is a general flow of traffic towards an urban center. The method requires dividing a rural area into "traffic sheds" based on land served by various collectors and arterials. Trip generation rates associated with various land uses are applied to estimate traffic volumes and compare future volumes to roadway capacity with a given amount of development. The method includes a market-based system for phasing development concurrent with roadway improvements. (Little Rock MPO and Williamson Co. TN)

Smart Growth Index Smart Growth Index is a sketch-planning transportation, land use, and community impact model. The model utilizes parcel or polygon level land use data along with street centerlines and transit routes. Users define an analysis area, select indicators to be measured, assemble GIS data, prepare and evaluate a baseline scenario, prepare and evaluate alternative scenarios, and compare the scenarios. In addition to computing indicators, a forecasting module allows future land use patterns to be forecast based on transportation network accessibility measures. (Charleston, SC MPO and Burlington, VT MPO)

Space Syntax/Ped-GRiD (Pedestrian Geographic Resources Information Database) are GIS-based modeling techniques to identify urban locations that have a potential to increase pedestrian use, based on location of pedestrian-oriented land uses and other facilities. The methods use available or readily obtainable data including census data, street networks, major trip generators, and pedestrian count samples to predict pedestrian volumes throughout a city. (City of Oakland, CA and Southern CA MPO)

- Solicit guidance from national practitioners as to the most effective tool(s) for analyzing the statewide tier. The

tool(s) should provide a mechanism to compare various alternatives, modal options, and operational strategies.

- Continue to support the development and maintenance of the statewide truck model. Determine data needs to allow future updates. Our travel demand models need to better reflect truck Average Daily Traffic and truck patterns/circulation within a local and/or regional area and be adaptable to changing economic/freight conditions. NCDOT needs to better understand corridor/system impacts of major distribution centers and intermodal terminals. The science of truck forecasting needs to improve, and our ability to model interaction between truck, rail, ship and aviation freight movement needs to improve. A technical opportunity we have is to further develop a Statewide Truck Network Model (1st phase of 3-year research projected will finish this summer) that North Carolina State University/ITRE has helped us build. It is built on federal data and could potentially be used to study diversion of freight from highway to rail or vice versa. Currently there are no additional research dollars to push this project into the next fiscal year.

- NCDOT needs to consider establishing a single point of contact (person or unit) dedicated to monitoring, researching, coordinating, advising and leading freight related initiatives**.** Dedicated staff would help with the following issues:

    1. Increasing emphasis on all aspects of freight (commodity data, demand models, participation of shippers/ports/trucking/railroads, staff at MPO level, system performance, operations and technology, funding, etc.)
    2. Rapidly changing economic conditions and globalization. Every major commerce and trade journal points to the nation's transportation system as the "core component" of a global supply change, i.e., goods are spending less time in warehouses and more time on trucks. In urban areas of the country companies are staggering truck start and end times to avoid am/pm peak and this is creating a "new" peak in the middle of the day. The US is moving to a service-based economy which means more dual axle delivery trucks and trips 24 hours a day and additional truck traffic is creating capacity constraint and air quality problems. Bottom line is time equals money and deteriorating freight reliability is going to cost US consumers more to buy goods and hurt US economy overall.
    3. NCDOT needs "eyes and ears" to follow national best practice and adopt ideas from others and to better coordinate responses to a number of initiatives. A great freight framework to follow is in Florida DOT, called the Strategic Intermodal Transportation System. http://www.dot.state.fl.us/planning/sis/. Other active initiatives (not exhaustive) to follow are:

        - development of the NC International Terminal in Southport and related transportation needs assessment/planning
        - development of the Norfolk Southern Intermodal Facility at the Charlotte Douglas Airport and a CSX intermodal facility that will be needed.
        - I-95 Corridor Coalition
        - NC Statewide Logistics Study
        - participating in FHWA monthly webinar (freight to freight conversation) http://www.ops.FHWA.dot.gov/freight/fpd/talking_freight.htm
        - Institute for Trade and Transportation (3 year commitment -- starting in 2007 for building a freight research center in New Orleans to provide freight consultation, technical assistance to 12 southeastern State DOTs)
        - National Cooperative Highway Research Program Project 8-53 Integrating freight into planning and programming
        - I-95 Corridor Coalition sponsored Southeast Rail Operations Study (SEROPs) and Mid-Atlantic Rail Operations Study (MAROPs) type initiatives that Shirley Williams and staff have been involved in
        - Inland terminal study by Western Carolina University

The Case for a Cabinet-Level Statewide Planning Position

(Whitepaper)

October 5, 2008

NCDOT Transformation Management Team

Transportation Planning Workstream

Cabinet-Level Position Workstream

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Executive Summary

North Carolina is experiencing a **"perfect storm"** in transportation planning.
Growing demand on our transportation system:

- Anticipated **doubling of vehicle-miles** traveled (VMT) by 2030
- NC **population** projected to **grow by 50%** between 2000 and 2030
- Projected to be **the 7th most populous state** by 2030

Construction costs are increasing:

- **80% construction** supplies **inflation** since 2002
- Spike in global asphalt, cement, steel prices **expected to continue**

Funding is declining:

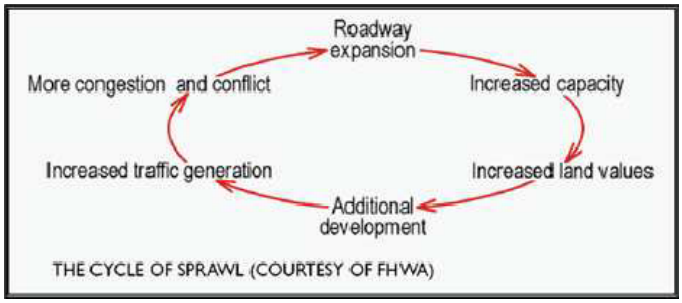
- State gas tax **purchasing power has declined** (construction inflation and mpg)
- The future **availability of Federal** transportation **funds** looks **precarious** at best, bleak at worst
- Transportation **funding flat/declining** for FY 2008/09

Aging infrastructure needs more maintenance dollars

Increased demand, aging infrastructure, increased costs, and flat or declining revenues mean that we can no longer build highway-centric transportation infrastructure the way we have been over the last 20 years. We must build more selectively and more strategically – both with highways and with other modes -- in order to maximize the benefit of the limited dollars available to us.

Meanwhile, the growing demand is having an environmental impact. According to NC Division of Air Quality, North Carolina's green house gas emissions are expected to be 269 million metric tons in 2020, 30% of which is attributed to transportation.

Land use and transportation are inexorably linked; where new transportation infrastructure is needed is largely established by land use and when highways are added/upgraded additional development also follows. Without smart, comprehensive land use planning linked to transportation strategies, we cannot hope to use limited funds to plan and implement effective and strategic transportation infrastructure.



THE CYCLE OF SPRAWL (COURTESY OF FHWA)

Not only is our transportation infrastructure at risk, but, according to the National Surface Transportation Policy and Revenue Study Commission, so is our national security, energy supply, public health, our competiveness in a global economy, and the environment. They go on to say, it is essential that the surface transportation system be transitioned away from fossil fuels, and that planners incorporate transportation into thoughtfully planned, efficient, and environmentally sustainable communities. This requires modal shifts from road transport to rail and public transportation systems, with a tangible set of outcomes including carbon dioxide and energy reductions, and increases in travel options for people and goods.[i] Future federal funding could depend on how well we plan sustainably.

These mass transit and rail options are only part of the solution; there will remain a large increase in trucks and cars on the State's highways that will need additional capacity and operational improvements to meet their transportation needs efficiently. The future will challenge us to use all the tools in our transportation tool kit, even consideration of congestion pricing and incenting industries to site close to available transportation capacity, to be successful.

Our recommended solution

We need to partner/work closely with the state agencies and organizations that have a large stake in – or are in a position to most influence – the factors that drive transportation and land use decisions and the resulting costs and environmental impacts. These include but are not limited to the Departments of Transportation, Commerce, and Environment and Natural Resources; local and regional planning organizations (who will continue to be responsible for land use planning); transit organizations; railroads; and other states. These are key players in developing cost effective transportation alternatives supported by sound land use plans to meet the transportation demands of our growing State.

To meet this need for comprehensive statewide planning, we recommend the establishment of a cabinet-level State planning position tasked with working with other State agencies and stakeholders to develop goals, strategies, performance measures and associated policies that would allow planning organizations to create coordinated land use and transportation plans in support of sustainable growth in the State. This position would report directly to the Governor who would provide the support and direction of his office to this important planning effort.

This position would be charged with the following objectives:

- Establish high level planning objectives (and associated limits) and policies for each of the following to be used as the State plans to accommodate growth projections: quality of life, air quality, efficient use of available State resources, transportation mobility considering all modes, energy use, economic development, land use including preservation of farm land and green space, water availability/quality, reducing VMT, and others.
- Establish goals, targets and performance measures for each of the above that can be used by each agency in support of the common objectives
- Assist State agencies, municipalities, and counties to meet these objectives by equipping with knowledge, resources, incentives, etc.
- Consider and help implement the findings of the State Logistics Plan developed for the Office of State Budget and the I-95 Corridor Coalition "Strategic Vision Study Objectives & Scenarios" and any other appropriate federal or State initiatives or guidance
- Identify areas/initiatives where the agencies can partner to meet these goals in a more efficient and effective manner for the State.
- Participate and represent the State in State studies and multi-state planning initiatives related to growth, land use, and infrastructure planning, such as:
    - State Logistics Plan

    - North Carolina International Terminal Planning
    - I-95 Corridor Coalition, etc.
- Review the recommendations of the 21st Century Transportation Committee and the National Surface Transportation Policy & Revenue Study Commission to determine which recommendations best progress the initiatives of sustainable development, reduced infrastructure costs, energy use and emissions while still providing mobility.
- Support and further the work and charge of the Climate Action Plan Advisory Group and the Legislative Commission on Global Climate Change and would enable the State to carry out the identified vision of these entities.

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[i] Volume I pages 4, 8, 26, & 28 *Transportation for Tomorrow: Report of the National Surface Transportation Policy and Revenue Study Commission* December 2007

The problem: A storm brews; change is needed.

Both nationally, and in our state, we find ourselves facing a crisis in providing future transportation service and facilities.

There is a growing demand on our transportation system:
- Anticipated doubling of vehicle-miles traveled (VMT) by 2030
- NC population projected to grow by 50% between 2000 and 2030
- Projected to be the 7th most populous state by 2030

Construction costs are increasing:
- 80% construction supplies inflation since 2002
- Spike in global asphalt, cement, steel prices expected to continue

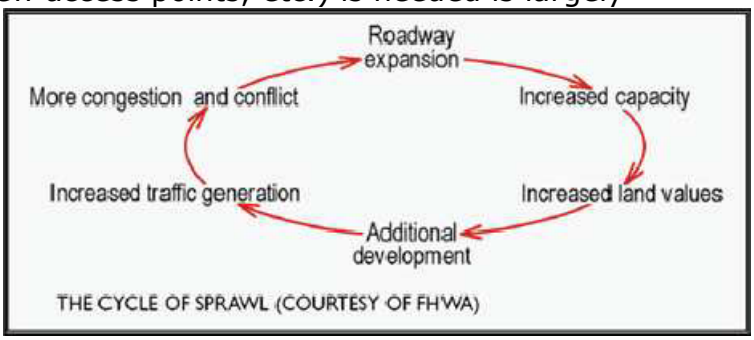
Funding is declining:
- State gas tax purchasing power has declined (construction inflation and mpg)
- The future availability of Federal transportation funds looks precarious at best, bleak at worst
- Transportation funding flat/declining for FY 2008/09

Finally, aging infrastructure needs more maintenance dollars are needed. The interstate system just passed its 50-year mark, which means the most expensive and critical highways are in need of much expensive maintenance.

We must be more strategic.
Increased demand, aging infrastructure, increased costs, and flat or declining revenues mean that we can no longer build highway-centric transportation infrastructure the way we have been over the last 20 years. We must build more selectively and more strategically – both with highways and with other modes -- in order to maximize the benefit of the limited dollars available to us. Of course, we know this – our understanding of this problem and the sense of urgency surrounding is what prompted the NCDOT to undertake its Transformation effort, and the General Assembly to establish its 21st Century Committee.

The environment is being affected negatively.
Meanwhile, the growing demand is having an environmental impact. According to NC Division of Air Quality, North Carolina's green house gas emissions totaled 184 million metric tons in 2000, and is expected to be 269 million metric tons in 2020. Of this, approximately 28% (2000) to 30% (2020) is attributed to transportation.

The Land Use – Transportation Connection
Land use and transportation are inexorably linked; where new transportation infrastructure (new roads, new lanes, new access points, etc.) is needed is largely established by land use. Therefore, being more strategic in our state's transportation infrastructure and helping minimize our environmental impact really requires a hard look at statewide land use planning. Without smart, comprehensive land use linked to transportation strategies, we can



THE CYCLE OF SPRAWL (COURTESY OF FHWA)

not hope to use limited funds to plan and implement effective and strategic transportation infrastructure. Currently, land use in North Carolina is left to local governments with little or no formal guidance from the State; consequently, land use planning is ad hoc and of varying degrees of effectiveness. For more on the transportation-land use connection, see Appendix.

Action is needed.
Just imagine the impact of 50% more people, industries, businesses and the resulting trucks and cars on the highways. Even if the State had unlimited funds, it has a huge opportunity and responsibility to each citizen to plan for this growth to ensure that we are protecting the things about the State that we love and need to sustain this growth for future generations. Many of the local governments and citizens are beginning to see this growth and are moving towards more land use planning and understanding the need to coordinate that with transportation options. They need the support of the State and the Governor's office to both lead and partner with them to develop joint goals, strategies and initiatives that can help them grow better and smarter, not just react to the growth with less that optimal solutions.

A 50% increase in the State's population and the growth in the Southeast US will not only require a joint effort to plan for transportation and land use but to protect the quality of life that we all enjoy. Issues of water availability and quality, air quality, protection of farm land, green space, mobility, energy use, etc. need to be incorporated into the State planning efforts to ensure that we are sensitive to all the important factors related to growth and that our growth is sustainable.

Nationally, there is an awareness and sense of urgency about the problem.
The National Surface Transportation Policy and Revenue Study Commission addressed issues related to transportation in their December 2007 report *Transportation for Tomorrow* including land use, greenhouse gas emissions, energy use, and planning for the future. The following are a few quotes from their report that are important to NC planning efforts:

- "Current transportation and land use policies are not well coordinated. This, in turn, undermines national security, energy, and environmental goals by contributing to **greater reliance on foreign petroleum**, higher greenhouse gas emissions, and **adverse public health impacts**."[ii]
- **"Transportation decisions and resource impacts are integrated.** The Nation's population is expected to swell to 420 million residents by 2050. Given the immensity of this increase, it is essential that the surface transportation system be transitioned away from fossil fuels, and that planners incorporate transportation into thoughtfully planned, efficient, and environmentally sustainable communities."[iii]
- "The United Nations' Intergovernmental Panel on Climate Change (IPCC) draft report dated November 2007 identified various transportation policies that could offset the growth of or reduce greenhouse gas emissions. One of the panel's recommendations is for nations to 'create **modal shifts** from road transport to rail and public transportation systems.'"[iv] Land use changes must accompany any attempt to increase rail and transit systems and usage in order for intermodal systems to be efficient and accomplish the desired outcomes.

- ""Develop a tangible set of outcomes tied to goals and purpose…carbon dioxide and energy reduction, increase in travel options for people and goods, safety and health." *– Anne P. Canby, President of the Surface Transportation Policy Partnership, at the Commission's Washington, D.C., field hearing.*[v]
- "Carbon Taxes or Trading. In the near term, Congress **may enact a tax on carbon** or a "cap and trade" system to reduce greenhouse gas emissions. To the extent that such a taxation or trading system encompasses transportation-related sources, **Congress should ensure that transportation activities that reduce greenhouse gas emissions receive a proportionate share of any revenue generated by these new schemes**."[vi] This suggests that future federal revenues could depend on smart statewide transportation and land use planning.
- "Economic forecasts indicate that by 2020, freight volumes will be 70 percent greater than they were in 1998. Without improvements to the surface transportation network (especially key freight transportation corridors), freight transportation will become less efficient and reliable, **hampering the ability of American businesses to compete in the global marketplace."[vii]**

Some work is already underway in NC
There is a move afoot – nationally, and in North Carolina, to address these environmental issues by reducing vehicle-miles traveled (VMT). Here in North Carolina, the General Assembly established in 2005 the Legislative Commission on Global Climate Change (LCGCC) to establish a goal for reducing greenhouse gases, and to recommend mitigation options. The Department of Environment and Natural Resources initiated the Climate Action Plan Advisory Group (CAPAG) in response to the Clean Smokestacks Act, to forecast emissions and recommend reduction measures. The CAPAG's final report is underway, but there will be a chapter on transportation and land use that will be of great interest to this effort. Also, in 2008, the General Assembly created the Legislative Study Commission on Urban Growth and Infrastructure Issues "to determine what measures the General Assembly may take to foster regional water resource and transportation planning, incentive-based local land use planning, and more responsive and cost-effective planning to accommodate rapid population growth in North Carolina's urban areas."

Already, statute requires municipalities to have an up-to-date land development plan prior to engaging in comprehensive transportation planning activities with NCDOT. While this is a start, this is not enough. While the State does not wish to usurp local land use planning responsibilities, a statewide perspective and statewide goals are necessary for individual localities to do effective land use planning that delivers desired outcomes.

Work already underway in nation
Nationally, California recently passed Senate Bill 375, an anti-sprawl measure, that pulled together the interests of environmentalists, builders, and local governments in a piece of legislation that comprehensively addresses land use, transportation, housing, and climate change. New Jersey has and Maryland is working on a statewide land use plan.

The solution: Our recommendation

How does the State grow by 50% while reducing VMT growth on a limited transportation budget?

Building more strategic transportation infrastructure and minimizing VMT, which is a critical component of minimizing statewide green house gas emissions, both require a comprehensive, statewide approach that is heavily integrated with strategically planned land use. Within North Carolina we need to develop land use plans and strategies that support economically viable transportation alternatives which manage the increase in VMT often caused by the new growth, while protecting the environment.

There is a critical Passenger travel component.
The State needs to develop plans for new and existing development which reduces the VMT required to go to and from work, meet the routine needs of their family, provide entertainment and even vacations. To do this, public transportation systems must be appealing and available to all socioeconomic classes and incomes. For more on passenger travel, see Appendix.

There is a critical Freight component.
The need to strategically plan and accommodate freight movement is also essential for reducing VMT. There must be smart land use that takes into account freight needs and associated development, and modal links where rail, highway, and ports can work together to minimize highway use. With economic forecasts projecting a 70% increase in freight by 2020 from 1998 levels, planning for freight is going to be essential.[viii] For more on freight, see Appendix.

There is a highway management component
These passenger and freight options are only part of the solution; there will remain a large increase in trucks and cars on the State's highways that will need additional capacity and operational improvements to meet their transportation needs efficiently. The future will challenge us to use all the tools in our transportation tool kit, even consideration of congestion pricing, to be successful.

Solution must be collaborative
NCDOT can not do it alone. We need to partner with work closely with the state and local agencies that have the most stake in – or are in a position to most influence -- land use, transportation infrastructure, and its resulting environmental impact; local and regional planning organizations (who will continue to be responsible for land use planning), transit organizations, railroads, and other states to plan for the future transportation demands.

Establish Statewide Planning Position
To meet this need for comprehensive statewide land use planning linked to cost-effective transportation solutions, we recommend the establishment of a cabinet-level State planning position tasked with working with other State agencies to strategically plan our State's land use and growth. This position would report directly to the Governor and work closely with entities such as NCDOT, the Department of Commerce, NC Department of Environment and Natural Resources, NCTA, the League of Municipalities, and the NCAMPO.

This collaborative, strategic position, which would cut across multiple agencies and local planning efforts, would be supported by the Governor's office and the legislature to plan for growth in the State. It would work with other States and multi-state planning groups

such as the I-95 Corridor Coalition to plan for transportation corridors that our citizens and industries need to support their transportation demands. The position would look at issues that involve different agencies, interests, and states, and work with them to develop recommendations and joint goals and initiative to address them.

This position would be charged with the following objectives:

- Establish high level planning objectives (and associated limits) and policies for each of the following to be used as the State plans to accommodate growth projections: quality of life, air quality, efficient use of available State resources, transportation mobility considering all modes, energy use, economic development, land use including preservation of farm land and green space, water availability/quality, reducing VMT, and others.
- Establish goals, targets and performance measures for each of the above that can be used by each position in support of the common objectives
- Assist State agencies, municipalities, and counties to meet these objectives by equipping with knowledge, resources, incentives, etc.
- Consider and help implement the findings of the State Logistics Plan developed for the Office of State Budget and the I-95 Corridor Coalition "Strategic Vision Study Objectives & Scenarios" and any other appropriate federal or State initiatives or guidance
- Identify areas/initiatives where the agencies can partner to meet these goals in a more efficient and effective manner for the State.
- Participate and represent the State in State studies and multi-state planning initiatives related to growth, land use, and infrastructure planning, such as:
    - State Logistics Plan
    - North Carolina International Terminal Planning
    - I-95 Corridor Coalition, etc.
- Review the recommendations of the 21st Century Transportation Committee and the National Surface Transportation Policy & Revenue Study Commission to determine which recommendations best progress the initiatives of sustainable development, reduced infrastructure costs, energy use and emissions while still providing mobility.
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Appendix

Supporting data

- "Not only is transit an important element of congestion relief strategies, it supports policies to reduce transportation energy consumption, greenhouse gas emissions, and air pollution if sufficient use is demonstrated."[ix]
- "Passenger rail service is in need of investment. Intercity passenger rail investment would help meet important national energy and environmental goals by shifting travel to trains, which consume approximately 17 percent less energy per passenger mile than air carriers and 21 percent less energy per passenger mile than automobiles."[x]

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More on The Land Use – Transportation Connection

The connection between land use and transportation is really a common-sense one. The two are inexorably linked; without smart, comprehensive land use, we can not hope to use limited funds to plan and implement effective and strategic transportation infrastructure. Where new transportation infrastructure (new roads, new lanes, new access points, etc.) is needed is largely established by land use.
The connection between land use and transportation is really a common-sense one. Where new transportation infrastructure (new roads, new lanes, new access points, etc.) is needed is largely established by land use. In an ideal world, land use would be planned in such a way as to allow appropriate transportation infrastructure to be put in place ahead of time, so that the land use is well served and the transportation network is not over-taxed. More often, however, this is not the case; instead, transportation needs tend to react to land use. For instance, suppose a developer proposes new 4000-home subdivision on the fringe of a large city. The City is eager for the growth, and hungry for the tax base, so all approvals are quickly granted. However, the only roads connecting this new subdivision to the city center and area freeways are narrow, old two-lane highways. The result is a quickly over-capacity system, and public clamoring for new roads and new widening projects to accommodate all the new traffic. The only way to accommodate these demanded improvements is to divert money from other priority projects, which have been needed for much longer to serve much older traffic demand. This happens not only with subdivisions, but with industry and commercial development as well. The link between land use and transportation is key; we cannot effectively manage our transportation infrastructure – and prioritize and fund needed improvements – apart from a deep understanding of current land uses, and what changes in land use are planned or anticipated in the future.

While development that overburdens existing infrastructure may often be a function of poor planning, it is also true that even with the best land use planning, cities cannot always accurately foresee where the private sector will find it lucrative to build. An argument can be made that in a capitalistic society, private industry must drive these kinds of growth, and that governments should not over-regulate where this kind of growth does and does not occur. We are not proposing to take sides in this argument, but rather

proposing we take steps to manage and maintain our infrastructure, resources, and environment. Letting development occur wherever it wishes means that we forfeit our ability to effectively manage our transportation system and transportation dollars. Suddenly, we face pressure to channel otherwise intended funds to a new project we had not anticipated.

The answer lies in a proper balance. A proper balance of flexible but managed land use, protected infrastructure investments, and responsible growth that takes into account well established environmental goals.

Since NCDOT does not do or want to regulate land use, we face a bit of a Catch-22. We have to rely on cities and counties to plan land use well, to consistently fulfill their land use plans, and to communicate with the Department any changes in as far advance as possible. Even if all cities and counties did this very well (which of course, they don't – some counties do not do it at all), we would still face the problem of there not being a comprehensive, statewide land use plan, or statewide land use guidelines, principles, or incentives. The statewide land use perspective becomes particularly important when we are looking at where large industry locates (e.g., Dell, FedEx, Spirit Aerosystems, etc.) and the role major freight corridors or facilities (e.g., the interstate system, railroads, airports, ports) should play.

The result is a critical deficiency: poorly managed growth on a statewide level, and poor ability to plan and manage our infrastructure to serve that growth, our public, while maintaining our State as a pleasant place to live.

Transportation for Tomorrow: Report of the National Surface Transportation Policy and Revenue Study Commission December 2007

[i] Volume I page 4, 8, 26, & 28
[ii] Volume 1 page 4
[iii] Volume I page 8
[iv] Volume I page 26
[v] Volume I page 28
[vi] Volume I page 43-44
[vii] Volume I page 17
[viii] Volume I page 17
[ix] Volume I page 21
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Cabinet-Level Position

Shirley Williams,
Director – Environmental & Planning
Rail Division

October 20, 2008

"Perfect Storm"

- Growing demand on our transportation system:
  - Anticipated **doubling of vehicle-miles** traveled (VMT) by 2030
  - NC **population** projected to **grow by 50%** between 2000 and 2030
  - Projected to be **the 7th most populous state** by 2030
- Construction costs are increasing
- Funding is declining
- Aging infrastructure
- Greenhouse gas issue – Transportation = 30%

How do we grow by 50%, limit VMT and expenditure?

- Partner with:
  - Agencies: Commerce, DENR, NCDOT
  - Planning organizations (MPO, RPO, etc.
  - Transportation authorities and owners
- Develop Policies, Goals, Strategies and Performance Measures to support the desired outcome

Desired outcome

- Coordinated land use and transportation planning that meets goals and growing demand while reducing VMT growth and protecting the environment – Sustainable Growth

Sustainable Growth

"Development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

Examples of Solutions

- More dense residential and supporting commercial development with mass transit service
- New industries sited on or near existing transportation capacity and incent their customers and supplier to site nearby
- Comprehensive plan for North Carolina International Terminal at Southport that provides cost-effective solutions for port traffic and induced demand across the State
- Work with other States to move more freight and people by rail

How do we Accomplish this?

Recommendation

- A cabinet-level position (with the backing of the Governor) to help support and drive the desired result
- A multi-agency group to support its efforts

Where could they make a difference?

- Coordinated Land Use and Transportation Planning to achieve sustainable growth
- Encourage planning that considers air quality, water availability/quality, mobility, energy use; and protects quality of life, farm land, green space etc.
- Planning to limit Greenhouse Gas/VMT
- Logistics/Freight planning
- Multi-state planning efforts
- Planning for the North Carolina International Terminal